

Celestri™ System



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Facing the Future

Users of communications technologies are clamoring for more — more capacity, clarity and speed. However, information technology has evolved to a point where larger memories and faster computers no longer produce the dramatic benefits users enjoyed during the last decade. The next giant step in improving the performance of current technology will not involve the equipment, but rather its access to bandwidth. Rapid, large-volume, real-time data

transfers clearly are becoming the next critical need of telecommunications markets around the globe.

A solution is the Celestri™ System. This satellite-based, broadband communication network will address the skyrocketing demand for multimedia, video and data transfer services. The result—the information superhighway effectively will be transformed into a communication autobahn.

Why Wireless?

Terrestrial systems will have great difficulty serving the exploding data services market. Their heavy reliance on infrastructure and capital investment is far from cost effective and restricts communications to specific geographic areas.

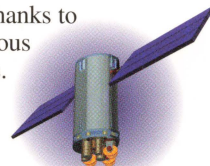
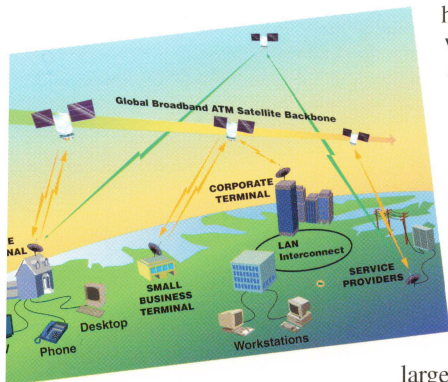
The Celestri System's broadband wireless architecture is designed to free users from earthbound wireline

services and their inherent inflexibility. Because the system's infrastructure will be in the sky rather than in the ground, communications traffic will not be limited to fixed-sized channels. Instead, the users' requirements would be satisfied by the dynamic assignment of bandwidth. In addition, the Celestri System will provide global service at a fraction of today's price.

Ultimately, the Celestri System will offer unprecedented data rates for both regional broadcast capabilities and real-time interactivity — thanks to an innovative combination of geosynchronous (GEO) and low-earth orbit (LEO) satellites.

Because the GEO satellites will be stationed at an altitude of 22,300 miles, they will match their orbital speed to the rotation of the Earth and remain stationary above a large region. At this altitude, the satellites will offer high-quality broadcast and multicast services. However, since this height also will cause a slight transmission delay, real-time interactivity will be provided by LEO satellites. Their orbital altitude will be approximately 900 miles, which will permit the real-time interface necessary for video conferencing, business transactions, telecommuting, and countless other interactive applications.

From the perspective of the end user, communications will be virtually immediate, transparent and seamless. Both GEO and LEO satellites will link with a single, small, low-cost user terminal. With the Celestri System, users essentially will be provided with bandwidth-on-demand and will pay only for what they use.





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Facts about the Celestri™ System

What is the Celestri System?

The Celestri System is a proposed communications network formed from an integrated family of advanced communications satellites, ground stations and terrestrial equipment that is designed to provide a broad range of multimedia, video and data services to communications carriers, multinational corporations, small- and medium-sized businesses, as well as telecommuters and other consumer customers throughout the world.

How Does the Celestri System Work?

Once completed and operational, the Celestri System will combine geosynchronous (GEO) high-earth orbit satellites and low-earth orbit (LEO) satellites with earth-based control equipment and interfaces. The GEO satellites, commonly known for providing broadcast services such as television, are fixed in high altitude (22,300 miles). A constellation of 63 LEO satellites, orbiting at 900 miles above the Earth, would provide telecommunications carriers, businesses and consumer customers instant access to a broadband network infrastructure and true bandwidth-on-demand. Additional LEO satellite capabilities would be integrated with the Celestri System to provide interactive communications to include high-speed, large-volume data trunking and backhaul services. By seamlessly networking LEO satellites with GEO satellites, the Celestri System would provide regional broadcast capabilities with real-time interactivity. Earth-based control equipment would include terrestrial-based network interfaces to telecommunications infrastructures, the Internet, corporate and personal networks, entertainment centers and residences. This equipment is designed to seamlessly interface to computers, HDTV, and Local Area Networks (LANs)/Wide Area Networks (WANs).

By uniquely combining high-capacity, high-speed networking with multimedia applications and interactivity, the Celestri System could provide the most effective communication channel to each application at a low user price. As the telecommunications market continues to grow at an accelerated rate, issues regarding the limited amount of frequency spectrum have surfaced. This scarce resource must be used as efficiently as possible in order to satisfy the surging demand for high-speed, large-volume communications. Spectrum sharing is Motorola's solution to this problem. By pointing the satellite antennas at different angles, Motorola's Celestri System would be able to avoid interference with different satellite systems operating in the same spectrum.

Who will use the Celestri System?

- Telecommunications Carriers – The Celestri System is intended to augment and enhance present-day terrestrial communication networks, as well as provide alternative, high-capacity access to terrestrial local loops and backbones, particularly at peak use times and during terrestrial outages. In addition, the system may provide globally uniform signaling and management as well as the ability to activate services to customers in hours rather than months.



Celestri Multimedia LEO System Specifics of FCC Filing

- Corporations and Businesses – The system would offer remote access to network LANs, corporate databases, and web sites from virtually anywhere in the world.

- Residences – Families would be able to gain real-time Internet access, as well as broadcasts of HDTV entertainment programming that includes local area content and an interactive component which, for example, would enable consumers to respond to advertising or shop at home.

What makes the Celestri System different from the IRIDIUM® System?

The design of the Celestri System is entirely different than the IRIDIUM® System in terms of application, spectrum, and market: fixed vs. mobile; broadband vs. narrowband; and high-speed data transfer vs. voice and messaging.

Constellation – LEO filing

Satellites	63
Planes	7
Altitude	1,400 km (870 mi.)
Inclination	48 deg.
Plane phasing	+28.57 deg.
Orbit period	6825 sec. (1.9 hrs.)
Usable capacity	80 Gbps
Service region at 16 deg. el. angle	60 deg. N and S Latitude extends to 70 deg. by mitigating effect of elevation angle (view or antenna)

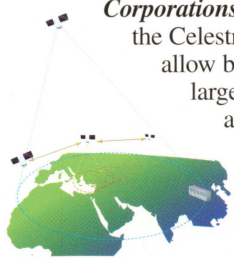
Satellite

Peak DC Power	13.6 kW
Average DC Power	4.6 kW
Mission Life	8 yrs. (10 yrs. expendables)
Stabilization & position sensing	3 axis stabilized; GPS
Dimensions (L-W-H, stored)	120 x 80 x 200 inches
Wet Mass	3,100 kg (6,834 lbm)
Dry Mass	2,500 kg (5,512 lbm)
Propellant	600 kg (1,323 lbm)
User service links – up	432
Frequency – earth to space	28.6-29.1 and 29.5-30.0 GHz
User service links – down	260
Frequency – space to earth	18.8-19.3 and 19.7-20.2 GHz
Intersatellite links	6
Intersatellite link rate	4.5 Gbps
Satellite switch rate	17.5 Gbps
Aggregate data rate	8.7 Gbps

<http://www.celestri.com>

Who Is It For?

Telecommunications Carriers — As planned, the Celestri System will seamlessly interface with current technologies, which will allow telecommunications carriers to expand their existing terrestrial networks. Since the Celestri System's data rates and signal quality will be comparable to fiber technology, the system will work with any existing equipment that is compatible with fiber-optic communications. Ultimately, telecommunications carriers could gain a decisive, competitive advantage by enhancing their existing product portfolio with the Celestri System's state-of-the-art video, multimedia and data services.



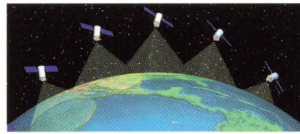
Corporations and Businesses — Motorola expects that the Celestri System's GEO and LEO satellites will allow businesses of all sizes to seamlessly transmit large amounts of data from virtually anywhere to anyplace on the globe. Telecommuters will be able to access their companies' LANs, corporate databases and web sites, while program managers will be able to rapidly send large amounts of data and images to foreign subcontractors and follow-up through video teleconferencing.

Residential Consumers — We anticipate that, in a matter of hours rather than weeks, any home will be able to connect to the Celestri System simply by installing an antenna on the roof and attaching an access unit to a home computer, telephone or television. With the Celestri System's service, families will be able to roam the Internet 100 to 1000 times faster than today. They also will be able to enjoy a wide range of entertainment and interactive services.

Motorola's Tradition of Innovation

At Motorola, we have a long, 70-year history of developing technologies that create new industries.

In the case of wireless communications, Motorola was there at the very beginning. We designed the first pager back in the 1950s. In the 1970s, we developed a prototype for the first portable cellular telephone. Today, with a highly diverse product portfolio and facilities across the globe, wireless is one of our core businesses.

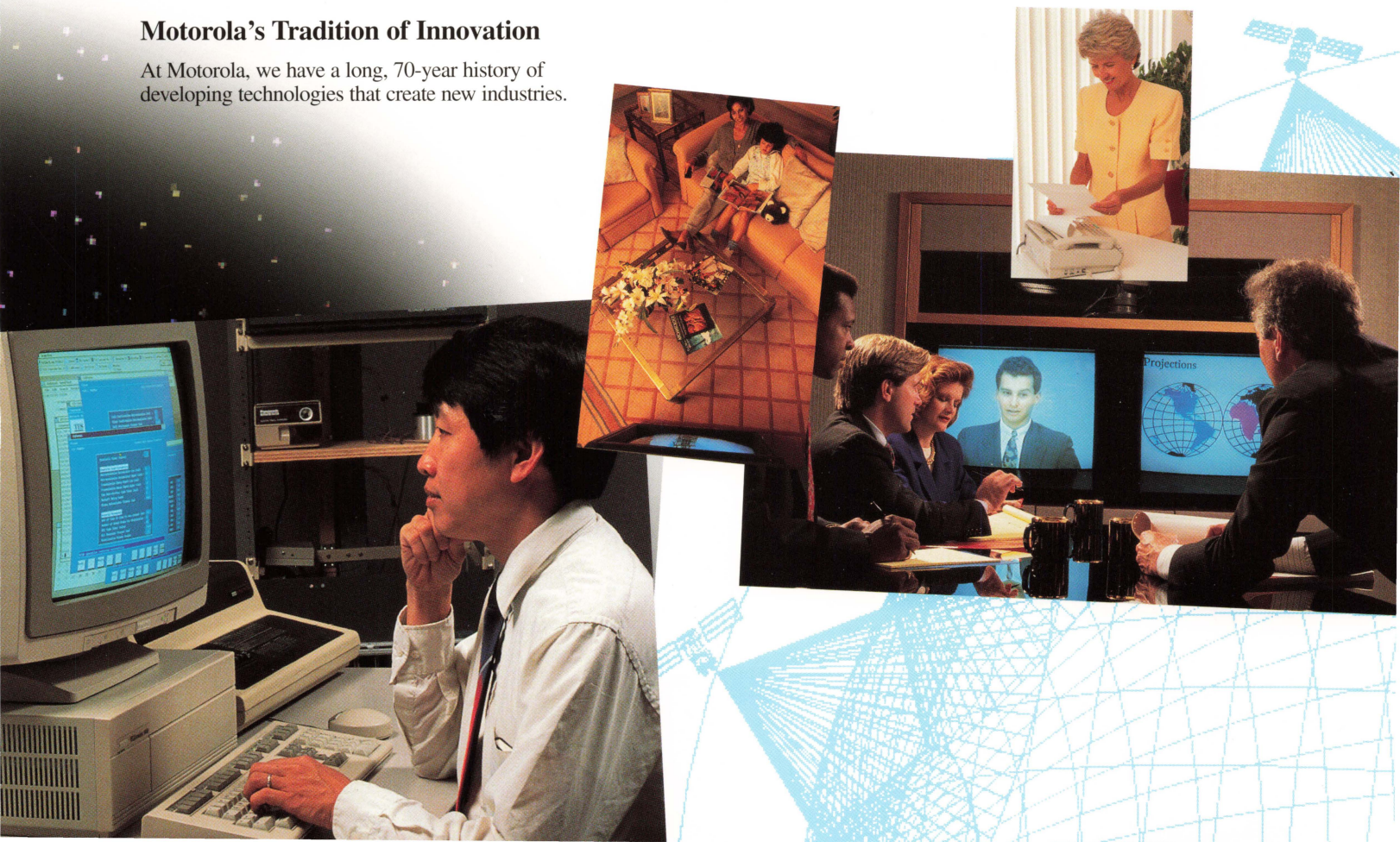


Our contributions to the space industry are equally significant.

In 1958, Motorola provided instrumentation for the Explorer I program, America's first venture into space. Since then, our technology has been aboard all American manned and most unmanned space flights.

Our knowledge of wireless and space technologies helped form the foundation upon which we are building the IRIDIUM® global personal communications system. This pioneering, state-of-the-art system enables any type of telephone transmission through a constellation of 66 LEO satellites. The IRIDIUM system is breaking new ground in the telecommunications industry because it marks the first time satellites have been successfully mass-produced. Because of this dramatic achievement, the system has been designed and is being deployed in significantly less time than typical space programs.

Motorola is leveraging this tradition of innovation and extensive technological experience to design and develop a space-based, broadband communication network. Users of telecommunications technologies will have greater access to bandwidth than ever before. The result: a breakthrough in large-volume, real-time transfers of video, multimedia and data — thanks to the Celestri System.






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